



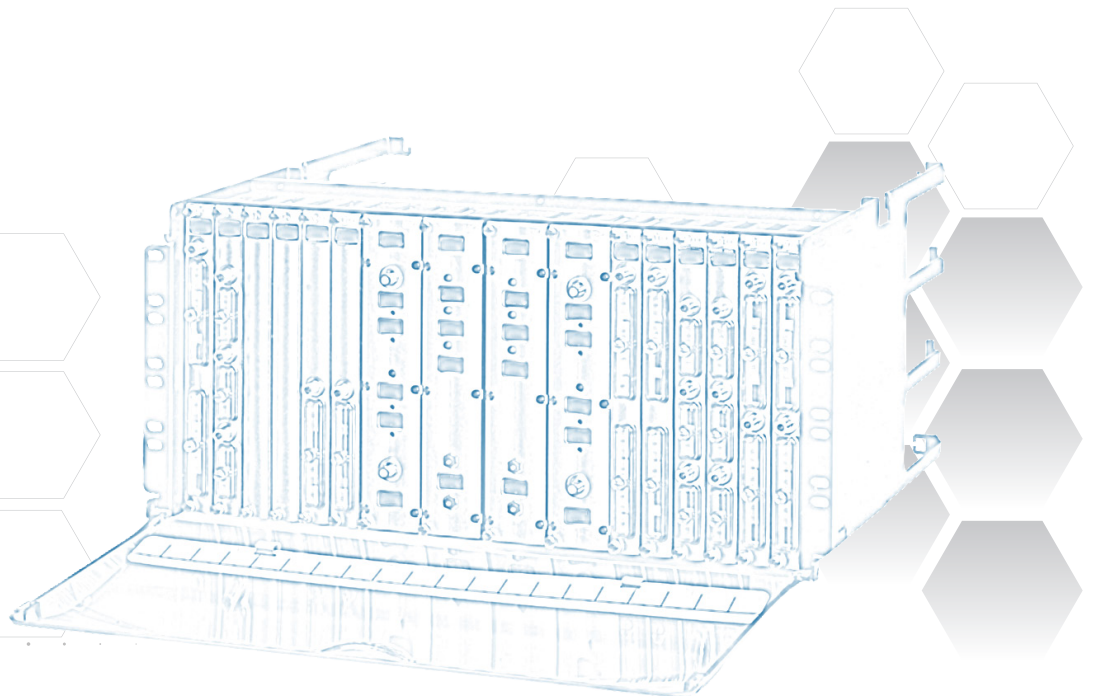
# SignalOn® Series

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## RF Passive Modules

## Installation & Operation Manual



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## About This Manual

The SignalOn Series is a modular system consisting of a 4-position, 8-position, or 20-position chassis and modules for combining and splitting of the headend signals in a CATV system. The system is designed to accommodate superior cable management and ease of use.

## Admonishments

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment. An admonishment identifies a possible hazard and then explains what may happen if the hazard is not avoided. The admonishments — in the form of Dangers, Warnings, and Cautions — must be followed at all times. These warnings are flagged by use of the triangular alert icon (seen below), and are listed in descending order of severity of injury or damage and likelihood of occurrence.



**Danger:** *Danger is used to indicate the presence of a hazard that **will** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*



**Warning:** *Warning is used to indicate the presence of a hazard that **can** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*



**Caution:** *Caution is used to indicate the presence of a hazard that **will** or **can** cause minor personal injury or property damage if the hazard is not avoided.*

## General Safety Precautions



**Warning:** *Never install equipment in a wet location or during a lightning storm.*

## Certification UL/ETL/CSA Listed

The SignalOn Series passive products have been tested and found to comply with the requirements of UL/CSA 60950.

## Standards

The following listing is a bibliography of applicable ANSI and Bellcore documents:

MIL-STD-202  
UL 60950

Test Methods for Electronic and Electrical Component Parts  
Safety, Telephone Equipment

## List of Acronyms and Abbreviations

The acronyms and abbreviations used in this manual are detailed in the following list:

<b>AWG</b>	American Wire Gauge
<b>ANSI</b>	American National Standards Institute
<b>CPE</b>	Customer Premise Equipment
<b>CI</b>	Customer Interface
<b>FCC</b>	Federal Communications Commission
<b>GND</b>	Ground
<b>MBB</b>	Make-Before-Break
<b>MON</b>	Monitor
<b>NID</b>	Network Interface Device
<b>RCV</b>	Receive
<b>XMT</b>	Transmit

# GENERAL DESCRIPTION

## 1. General Description

The SignalOn Series is a modular system allowing for combining and splitting of the headend signals in a CATV system. The system is designed to accommodate efficient cable management, EMI shielding, and ease of use. All of these help to facilitate easy reconfiguration and high performance within a dynamic headend environment.

### 1.1. Splitters/Combiners

Splitters and combiners are modular devices designed to slide into a chassis and secured by thumbscrews. They are available in a plain style or pads-and-monitor style. Modules have BNC or F type connectors for customer connections. A variety of splitters and combiners may be installed in each chassis.

#### 1.1.1. Pads-and-Monitor Style Splitters and Combiners

Splitters and combiners with monitor ports are available with either 0 dB or 6 dB default attenuation. Module attenuation default value, module type, and monitor information is noted on the blue label located at the top of each module. For example, the label shown in Figure 1 indicates that this is a combiner module; it is a 3-up, 2-to-1, with on-board default attenuation of 0 dB. It also has three monitor ports all 20 dB down from the common port. Attenuation pads may be installed to change the attenuation from 0 to 20 dB.

COMB	MON
3X[2:1]	20dB
DEFLT	20dB
0dB	20dB

Figure #1: Module Label

Pad contacts are make-before-break (MBB). This means that without an attenuator in place, the make-before-break contact is closed, providing the on-board default attenuation value to the circuit. When an attenuator pad is inserted, the make-before-break contacts open, routing the signal through the attenuator, replacing the on-board default attenuation value of 0 dB or 6 dB with the value of the attenuator pad. A monitor port is included on the padded modules, providing a –20 dB reference signal with high isolation between the monitor and input ports. See schematic on each module for details.

#### 1.1.2. Pads

The attenuation pads used in these modules are available with insertion loss values of 0 to 20 dB in 1 dB steps and are for use in the frequency range: 5 MHz to 1,000 MHz.

##### 1.1.2.1. Changing Attenuation Pads

When make-before-break modules are used attenuation pads may be changed without interrupting the signal. Attenuation pad value is stamped on the front of each pad. Determine new attenuation value required. Remove the existing attenuation pad and install a new pad with the appropriate value as follows:

1. Remove protective cover from the front of the module by loosening the thumbscrew.
2. Grasp the pad to be changed and pull it straight out of the module.
3. Position new pad in the module and press straight into place.
4. Replace protective cover on the front of the module and hand-tighten the thumbscrew.

## 1.2. Diplex Filter Module

SignalOn diplex filter modules allow for passive band splitting of both forward, and reverse signals. Each module houses three separate diplex filter circuits. All circuit connections are accessible on the rear of the module housing. Attenuator pads, and test points similar to splitter/combiner modules are not available on this module.

## 1.3. Condition and Monitor Module

The condition and monitor module allows a signal to be passed through two make-before-break pad sockets before being monitored by a  $-20$  dB directional coupler. This allows a technician the ability to use one pad socket for padding and one pad socket for equalization. A simplified Condition and Monitor schematic is shown in Figure 2.

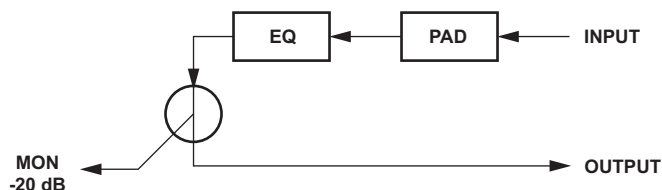


Figure #2: Condition and Monitor Module Schematic

## 1.4. Chassis

There are three SignalOn chassis. The 4-position chassis has no provisions for power and only supports passive modules. The 8- and 20-position chassis have provisions for power and support both active and passive modules.

The 4-position chassis is 1.75 inches (4.45 cm) high (1RU), designed for installation in 19-inch EIA racks. The SignalOn 4-position chassis is shown in Figure 3. Chassis mounting brackets may be moved to the front of the chassis allowing chassis to be turned around in the mounting rack. When chassis is turned around modules are installed from the rear allowing access to the connectors on the front.

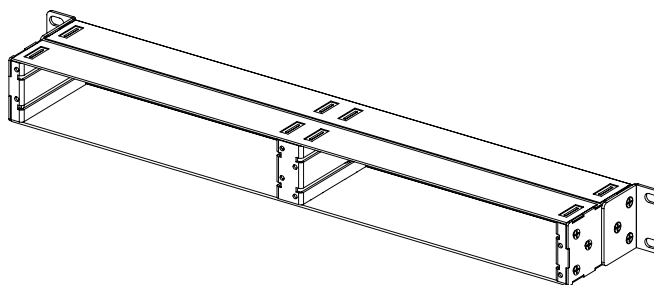


Figure #3: 1RU 4-Position Chassis (Front)

The 8-position chassis is 3.49 inches (8.86 cm) or 2 Rack Units (RU) high, designed for use in 19-inch EIA racks. The SignalOn 2RU chassis is shown in Figure 4. Optional extender brackets are available for 23-inch rack installation.

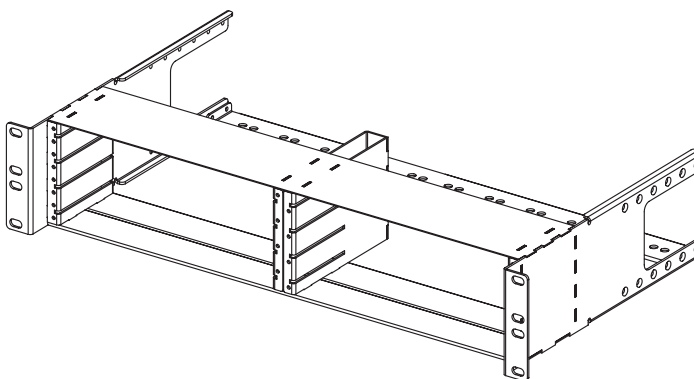
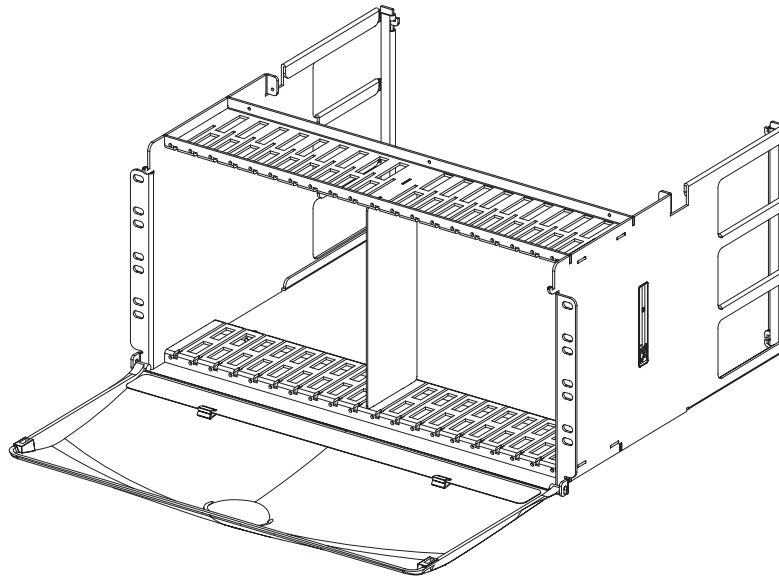


Figure #4: 2RU 8-Position Chassis



The 20-position chassis is 8.75 inches (22.23 cm) or 5 Rack Units (RU) high, designed for use in 19-inch EIA racks. modules are installed vertically in this chassis. The SignalOn 5RU chassis is shown in Figure 5. Optional extender brackets are available for 23-inch rack installation.



**Figure #5: 5RU 20-Position Chassis with Door Installed**

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## FUNCTIONAL DESCRIPTION

### 2. Functional Description

Figure 6 shows a generic block diagram of a Splitter/Combiner without attenuation pads or monitor port. Figure 7 shows a generic block diagram of a Splitter/Combiner with attenuation pads and monitor port.

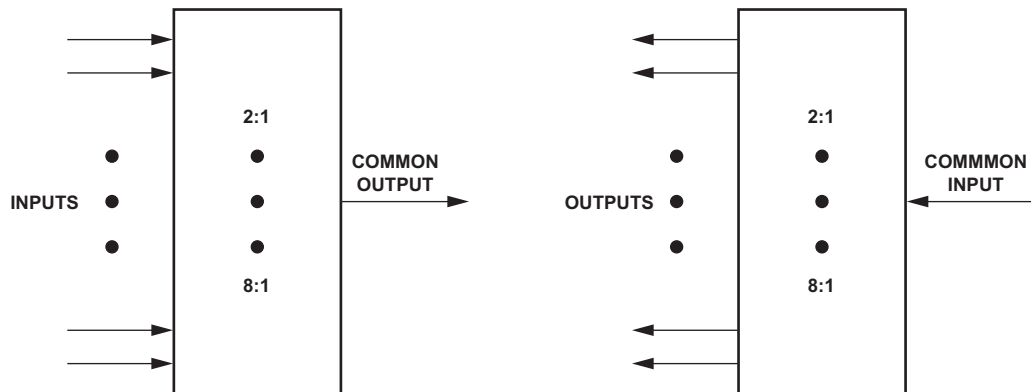


Figure #6: Splitter/Combiner Block Diagram without Attenuation Pads or Monitor Port

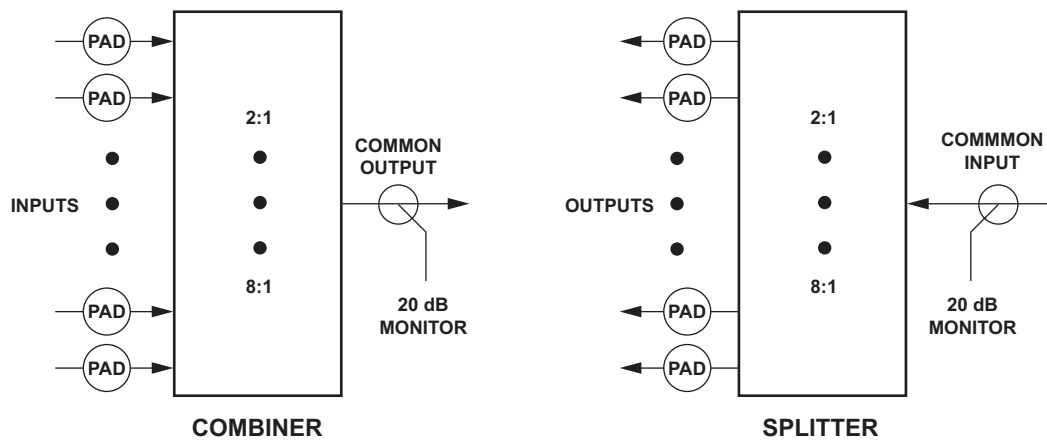


Figure #7: Splitter/Combiner Block Diagram with Attenuation Pads and Monitor Port

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# PLANNING

## 3. Planning

Several things need to be considered when planning for the location of the SignalOn Series chassis. Some of these are:

- Chassis should only be installed in restricted access areas (dedicated equipment rooms, equipment closets, etc.) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA 70.
- When using open relay-rack style network bays, spacing between bays and at lineup ends may be required depending on the quantity and type of coaxial cable entering the bays. When spacing bays 0, 5, or 10 inches, verify that vertical jumper rings will fit between bays.
- A fully loaded chassis may terminate up to two-hundred cables. Consideration should be given to the number of chassis installed in a rack to prevent cable congestion.
- Allow sufficient room for cable management behind the chassis. Also leave sufficient vertical and horizontal cable pathways above and below the chassis.

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## CHASSIS INSTALLATION

### 4. Chassis Installation

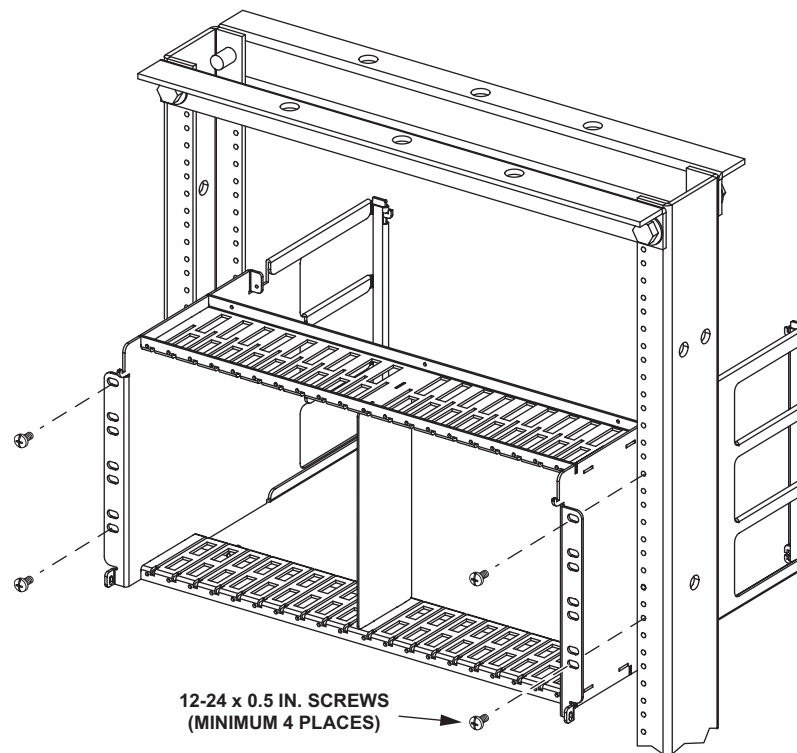


**Warning:** *Never install equipment in a wet location or during a lightning storm.*

This section provides the procedures necessary for installing and cabling the SignalOn Series Chassis in a 19-inch equipment rack. Optional extension brackets are available for installation in 23-inch rack applications.

Use the following procedure to install chassis in a 19-inch network rack, or equivalent.

1. Obtain a Flat blade or Phillips screwdriver (type to match mounting screws).
2. Place the chassis in the assigned mounting space and align the holes in the mounting brackets with the holes in the equipment rack. See Figure 8.
3. Secure the mounting brackets to the equipment rack using the 12-24 x 0.5-inch binder head machine screws provided. Torque these screws to approximately 27 pound-inches (3.1 Newton meters).



**Figure #8: Installing Chassis in Rack**

## 4.1. Connect Chassis Ground

This procedure establishes a ground connection between chassis and the frame ground connection. Two frame ground terminations (#8 screw) are provided on the back of the 5RU chassis, for a frame ground connection. A single frame ground termination (#8 screw) is provided on the back of the 1RU and 2RU chassis, for a frame ground connection. This connection must be made in accordance with all local and national electrical codes.

1. Using AWG 14 (or larger) stranded wire, connect frame ground using the FRM GND screw located in the lower left or right corner on the rear panel of the chassis (shown in Figure 9, Figure 10, and Figure 11) tighten the screw securely.
2. To assure proper operation the Frame Ground stud should be connected to a good earth ground through the local grounding system.
3. Connect the other end of the ground wire to the office ground conductor. Ensure this connection is made using methods and hardware that meets all applicable local and national electrical codes.

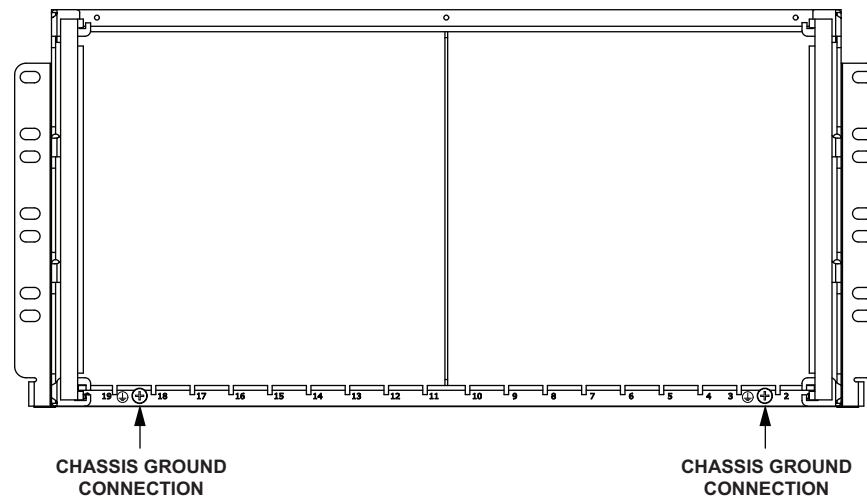


Figure #9: 5RU Chassis Ground Connection (Rear View)

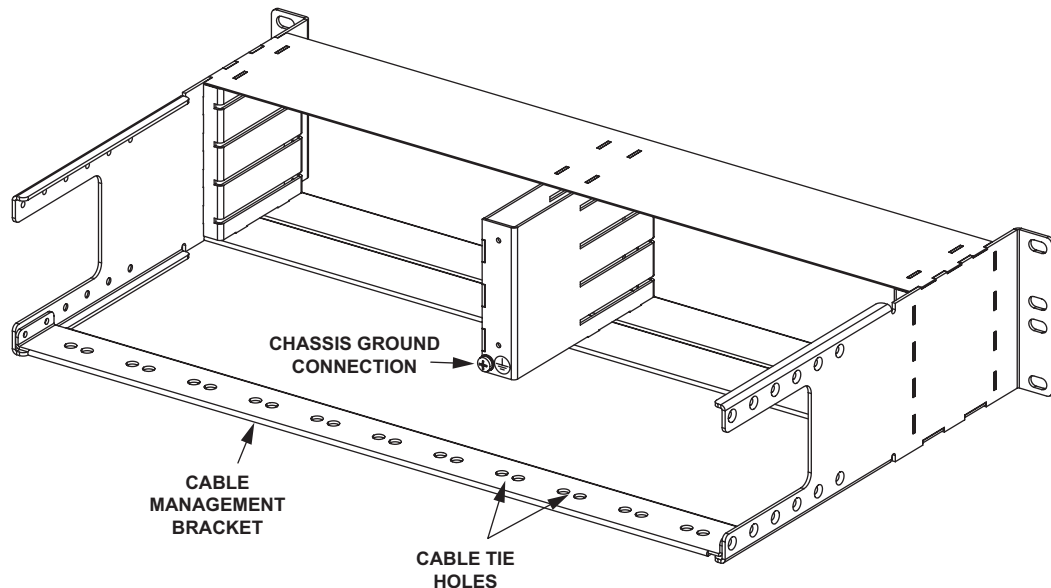


Figure #10: 2RU Chassis Ground Connection (Rear View)



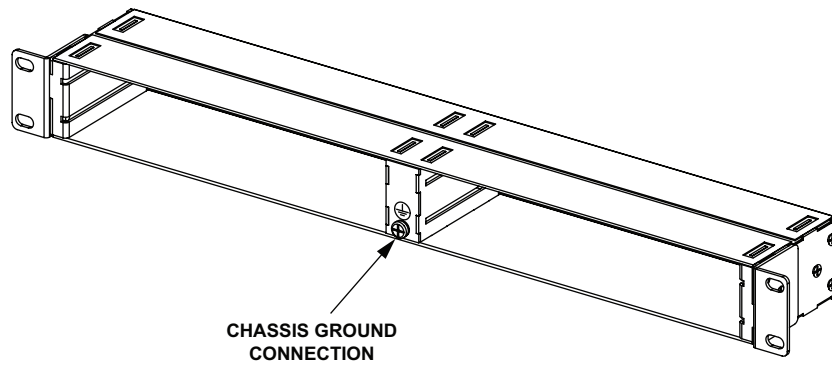


Figure #11: 1RU 4-Position Chassis Ground Connection (Rear View)

## 4.2. Plug-in Modules

Use the following procedure to install modules in the SignalOn Series chassis.

1. Making sure the ATX logo (or any other front panel lettering) is readable (i.e., upright), slide the plug-in module into its designated location in the chassis, and then secure the module using its two captive retaining screws. See Figure 12.

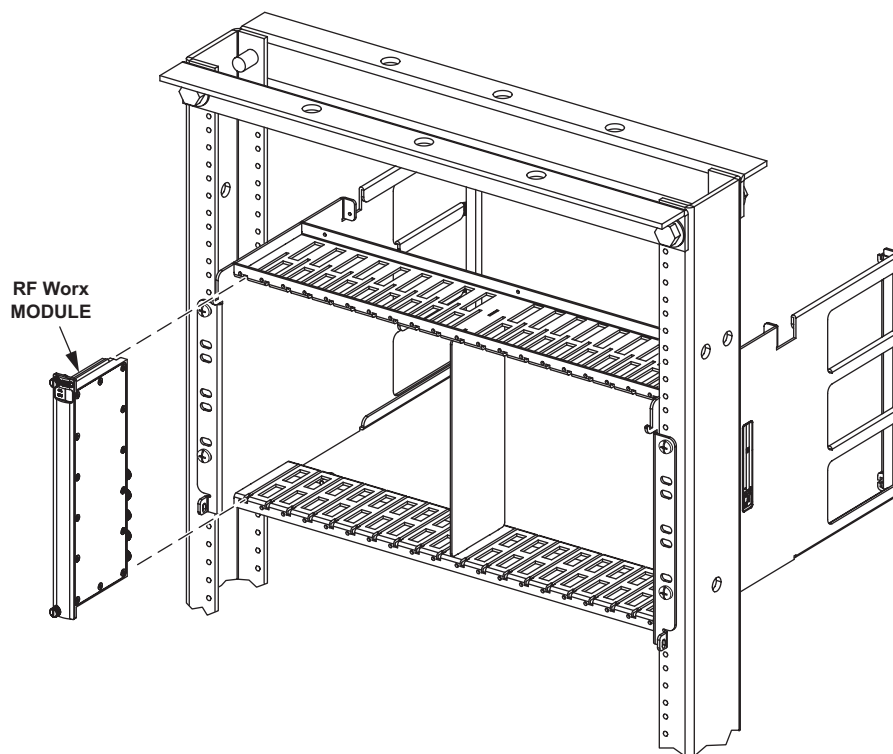


Figure #12: Module Installation

2. After each module is loaded into the chassis, refer to your work order, and connect the designated RF cables to the appropriate BNC or F connectors on the modules in the chassis.
3. Carefully route the cables through the cable management slots located on each side of the rear of the chassis.
4. Use the cable management guidelines found in this manual to route cable from the chassis to the rack/cabinet.
5. Perform any cabling or operational tests required at your facility.

### 4.3. Install Door (5RU Chassis)

Door is installed on the front of the chassis. It pivots on two hinge points located on the lower outside corners of the door. These two hinge points go into slotted holes in each side of the chassis. Once installed, door is raised and latches on two short extensions at the front of the chassis. To install:

1. Grasp the door (inside facing up) with both hands. See Figure 13.
2. Place your thumbs towards the center of the door.
3. Gently push down with your thumbs while holding the ends of the door with your fingers.
4. Slide hinge pin on one end of the door into the slot on that end. At the same time slide the other hinge pin on the other end of the door into the slot at that end.
5. Release the downward pressure on the door, the door will straighten out and slide into the hinge slots in the chassis.

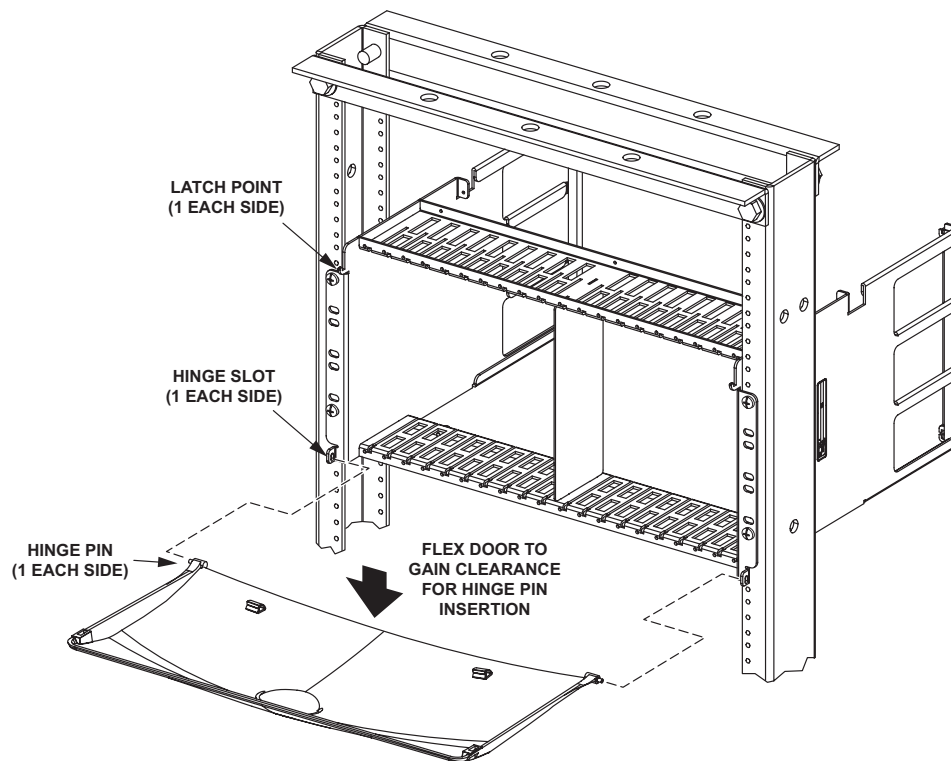


Figure #13: Door Installation

#### 4.4. Install Cable Designation Card (5RU Chassis)

Slide designation card into plastic hinges mounted on the back of the door, see Figure 14. Cable designations should be visible from the front of the chassis when door is open. Flip designation card over before closing door, cable designations are now visible when door is closed.

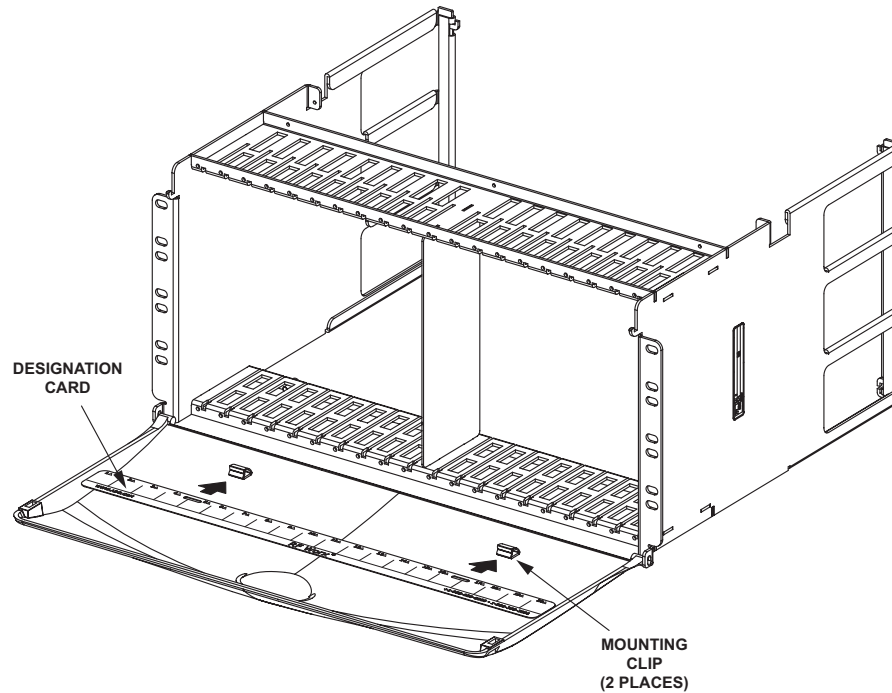


Figure #14: Cable Designation Card Installation

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## CABLE MANAGEMENT

### 5. Cable Management

Use the following guidelines when cabling modules in the chassis.

**NOTE:** The Common (C) port on the new SignalOn Series module has been moved to enhance electrical performance. Note the location of the C port before routing cables.

#### 5.1. 5RU 20-Position Chassis Cabling

##### 5.1.1. Cabinet Considerations

1. Cable the uppermost Chassis first; route the cables through the top cable ring closest to the front of the cabinet. Cables from the next-lower chassis exit the cabinet through the next top cable ring toward the rear of the cabinet.
2. Route the cables from the two lowest Chassis through the cable rings at the middle of the cabinet then through the two rearmost rings at the top of the cabinet.

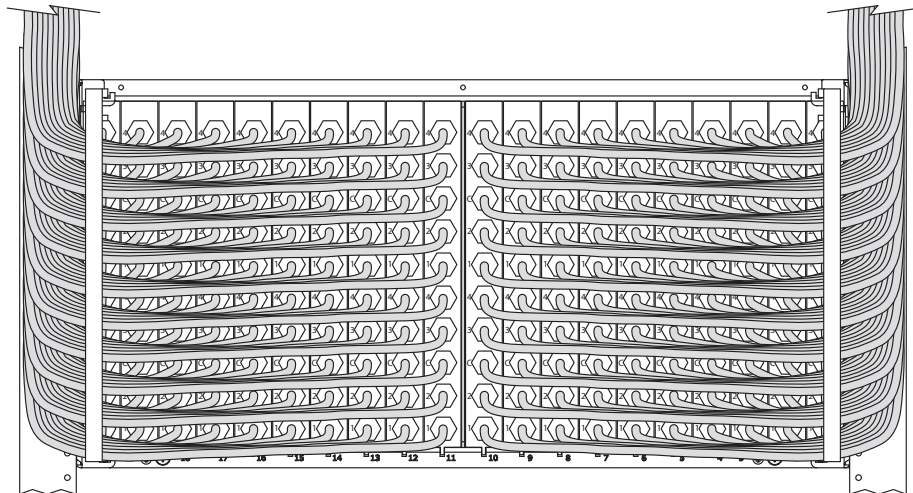


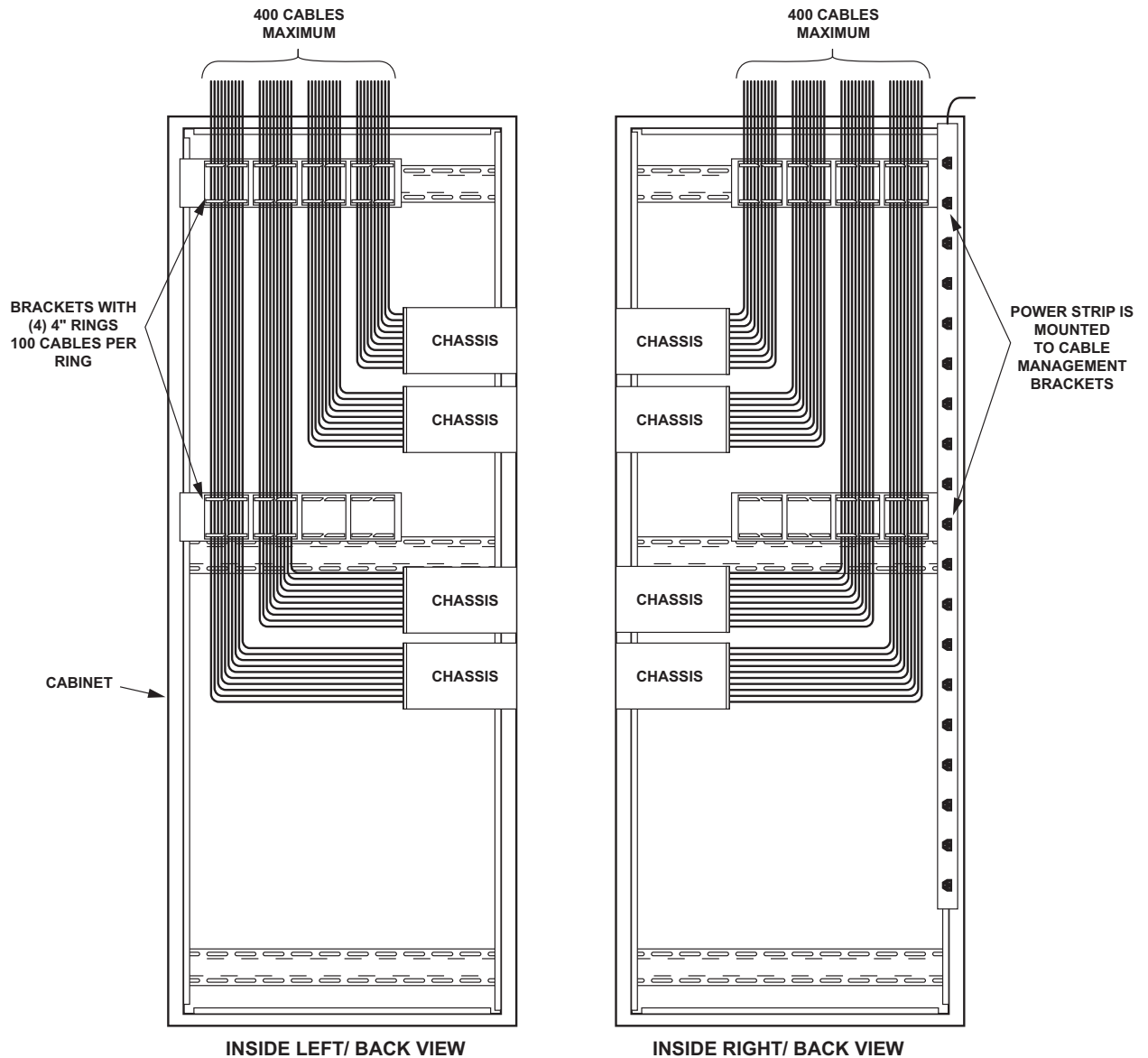
Figure #15: Fully Loaded Chassis with 2 Up 4:1 Modules

##### 5.1.2. Module Cabling Considerations

1. Within a given Chassis, cable the outer modules first; i.e., Modules 1 and 20, then 2 and 19, 3 and 18, etc. Keep the cables in a horizontal plane as shown in Figure 15 and route them through the side access slots on the side of the chassis. Route cables from Modules 1–10 up the inside of the right side panel (as viewed from the rear), and route the cables from Modules 11–20 up the inside of the left side panel (as viewed from the rear).
2. Keep all Module-to-Module wiring in the same horizontal plane.
3. To help prevent cable congestion Module-to-Module cabling to different ports in the same chassis should go OUT the side access slots, then back through another access slot at the same level as the second port. Cabling from one chassis to another should also be routed through the side access slots.
4. Install cable retainer bars on each side of the chassis.
5. Place a precision 75-ohm terminator on any unused ports.

### 5.1.3. General Considerations

1. Route all cables through the side access slots before routing them through the cable management rings at the top of the cabinet (or middle and top of cabinet, as in Figure 16). All cables must exit the rack through the 4-inch by 4-inch rings at the top of the cabinet, where one ring is dedicated to each chassis.



**Figure #16: Cable Ring Usage and Power Strip Positioning and Mounting**

2. If power is required in the cabinet, a power strip can be mounted on the right-side ring brackets (as viewed from the back), as close as possible to the back of the cabinet. (See Figure 16.)

## 5.2. 2RU 8-Position Chassis Cabling

The 2RU chassis has an optional adjustable cable management bracket. The bracket can be moved forward or back to allow for the desired cable bend radius. To move the cable management bracket remove the two screws on each side and slide the bracket to the desired position. Insert and tighten the screws removed earlier. Holes are provided in the cable management bracket for cable ties. See Figure 17.

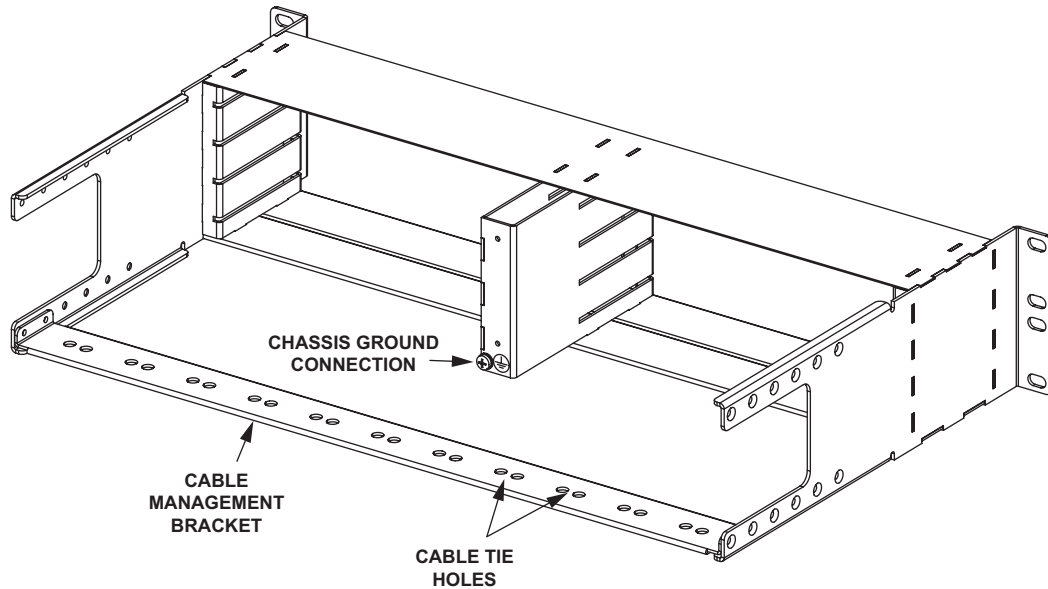


Figure #17: 2RU Chassis Cable Management Bracket

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# OPERATION

## 6. Operation

There are no specific operating instructions for the passive components covered in this user manual. Once they are installed in their respective chassis, they perform their designated RF passive signal management functions (splitting or combining) without further attention.

### 6.1. Module Applications

#### 6.1.1. Combining

In traditional combining applications (Figure 18), the SignalOn Series modules mount conveniently at the top of a modulator bay.

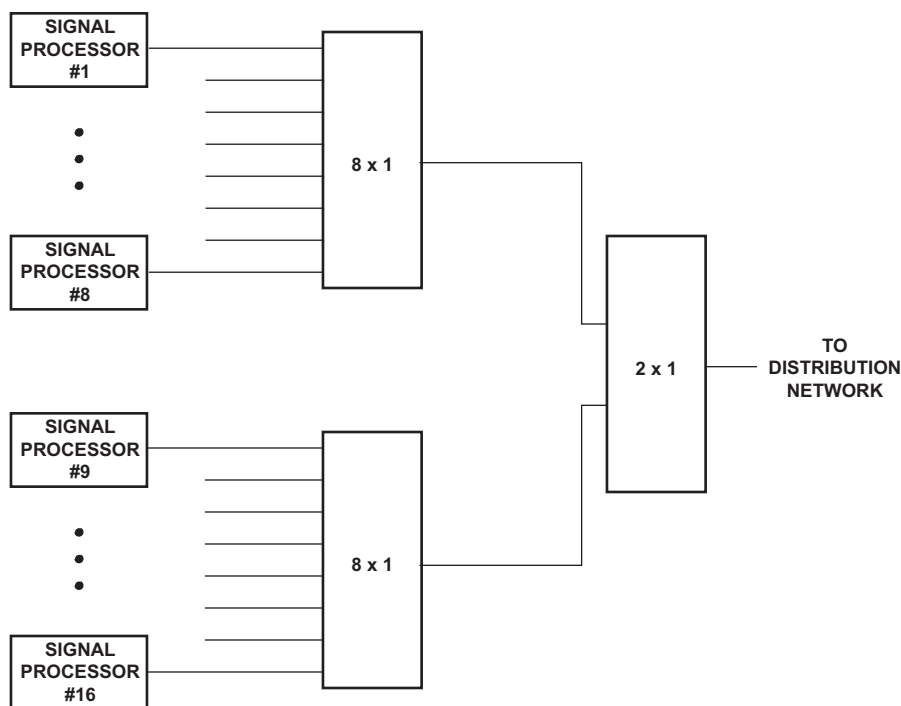


Figure #18: Combining 16 Input Signals

### 6.1.2. Distribution

For traditional distribution applications (see example in Figure 19), the SignalOn Series modules provide the splitting function with multiple splitting ratios and a high-density rack mount solution. Splitting modules are available with a variety of splitting ratios.

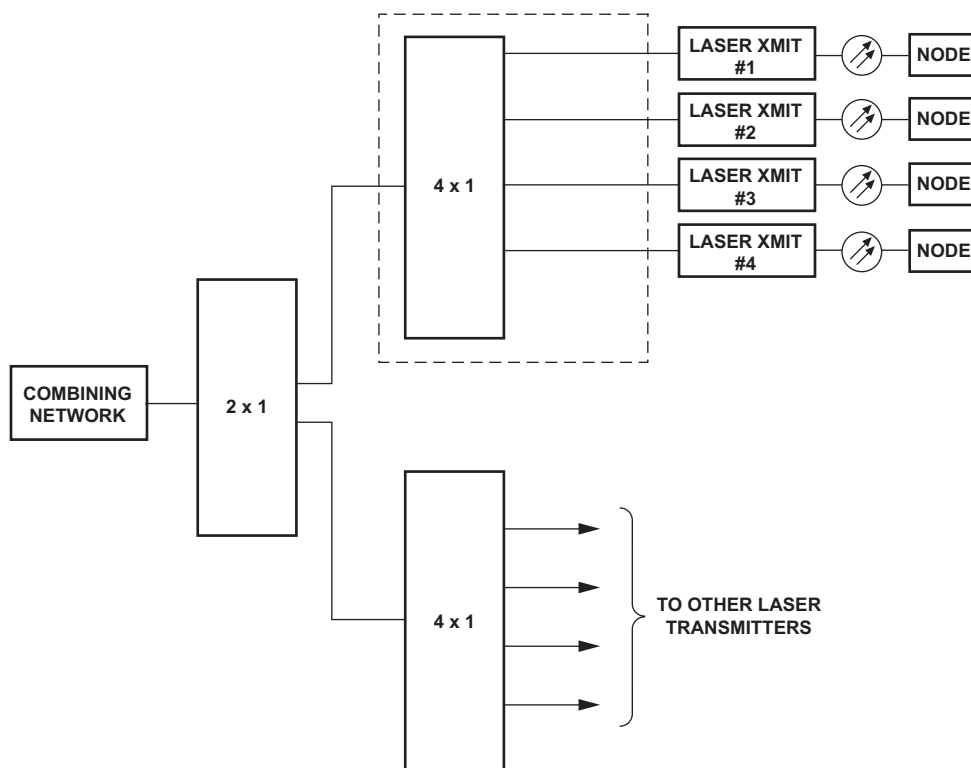


Figure #19: Distributing Signals

# MAINTENANCE

## 7. Maintenance

Maintenance requirements for the SignalOn Series passive components covered in this manual are minimal, consisting merely of periodic cleaning.

### 7.1. Preventive Maintenance

**NOTE:** There are no customer serviceable parts in any of the components in this system; return all failed components to ATX Networks for service or repair. Opening the module voids all applicable warranties.

The outside of the chassis and passive components should be cleaned during routine office equipment maintenance. Care must be taken to prevent dust and dirt from getting into any of the coaxial jacks or connectors.

For any repairs, contact ATX Networks at the telephone number listed in Section 9, Service & Support, of this manual.

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# SPECIFICATIONS

## 8. Specifications

Physical and environmental specifications are noted in Table 1. Module specifications are given in Table 2, through Table 16.

PARAMETER	SPECIFICATIONS	REMARKS
<b>Physical</b>		
Chassis Dimensions (W × D × H)	19 × 15 × 8.72 inches (48.26 × 38.1 × 22.15 cm)	20-Position
	19 × 10.3 × 3.49 inches (48.26 × 26.2 × 8.86 cm)	8-Position
	19 × 9.84 × 1.72 inches (48.26 × 25 × 4.37 cm)	2-Position
Empty Weight	8.5 pounds (3.86 kg)	20-Position
	4.6 pounds (2.1 kg)	8-Position
	3.14 pounds (1.4 kg)	2-Position
<b>Environmental</b>		
Operating Temperature	0°C to + 50°C (+32°F to +122°F)	Flatness ±0.5 dB from 25°C (77°F) ambient.
Storage Temperature	– 40°C to +70°C (–40°F to +158°F)	
Storage Humidity	5 to 95%	No condensation
<b>Electrical</b>		
RF Input	44 dBmV @ 110 channels	
Composite Second Order (CSO)	–70 dBc @ 110 channels/44 dBmV	
Composite Triple Beat (CTB)	–70 dBc @ 110 channels/44 dBmV	
Impedance	75 Ohms nominal	

Table #1: Physical and Environmental Specifications

ASSEMBLY TYPE 2-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1–2 to C–Port	–3.8±0.5	–3.8±0.5	–3.8±0.5	–3.8±0.5	–3.8±0.5	–3.8±0.5	dB
Return Loss Min. All Ports	–20	–20	–20	–20	–20	–20	dB
Isolation Min. Adjacent Ports	–30	–30	–30	–30	–30	–30	dB
EMI Min. Near Field	–100	–100	–100	–100	–100	–100	dB

Table #2: 2 Way Splitter/Combiner

ASSEMBLY TYPE 4-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1–4 to C–Port	–7.3±0.5	–7.3±0.5	–7.3±0.5	–7.3±0.5	–7.3±0.5	–7.3±0.5	dB
Return Loss Min. All Ports	–20	–20	–20	–20	–20	–20	dB
Isolation Min. Adjacent Ports	–30	–30	–30	–30	–30	–30	dB
EMI Min. Near Field	–100	–100	–100	–100	–100	–100	dB

Table #3: 4 Way Splitter/Combiner

ASSEMBLY TYPE 8-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1–8 to C–Port	–11.6±0.5	–11.6±0.5	–11.6±0.5	–11.6±0.5	–11.6±0.5	–11.6±0.5	dB
Return Loss Min. All Ports	–20	–20	–20	–20	–20	–20	dB
Isolation Min. Adjacent Ports	–30	–30	–30	–30	–30	–30	dB
EMI Min. Near Field	–100	–100	–100	–100	–100	–100	dB

Table #4: 8 Way Splitter/Combiner

ASSEMBLY TYPE MBB 8-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss C-Port to Ports 1-8	–12.4±0.5	–12.4±0.5	–12.4±0.5	–12.4±0.5	–12.4±0.5	–12.4±0.7	dB
Monitor Level C-Port to M-Port	–20.0±0.6	–20.0±0.6	–20.0±0.6	–20.0±0.6	–20.0±0.6	–20.0±0.8	dB
Return Loss Min. All Ports	–20	–20	–20	–20	–20	–20	dB
Isolation Min. Adjacent Ports	–30	–30	–30	–30	–30	–30	dB
EMI Min. Near Field	–100	–100	–100	–100	–100	–100	dB

Table #5: 8 Way Splitter, MBB with 0 dB Default Port Attenuation

ASSEMBLY TYPE MBB 8-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1-8 to C-Port	-12.4±0.5	-12.4±0.5	-12.4±0.5	-12.4±0.5	-12.4±0.5	-12.4±0.7	dB
Monitor Level Ports 1-8 to M-Port	-32.4±0.6	-32.4±0.6	-32.4±0.6	-32.4±0.6	-32.4±0.6	-32.4±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #6: 8 Way Combiner, MBB with 0 dB Default Port Attenuation

ASSEMBLY TYPE MBB 4-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss C-Port to Ports 1-4	-8.6±0.5	-8.6±0.5	-8.6±0.5	-8.6±0.5	-8.6±0.5	-8.6±0.7	dB
Monitor Level C-Port to M-Port	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
Isolation Min. Adjacent Circuits	-70	-70	-70	-70	-70	-70	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #7: 4 Way Splitter, MBB with 0 dB Default Port Attenuation

ASSEMBLY TYPE MBB 4-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1-4 to C-Port	-8.6±0.5	-8.6±0.5	-8.6±0.5	-8.6±0.5	-8.6±0.5	-8.6±0.7	dB
Monitor Level Ports 1-4 to M-Port	-28.6±0.6	-28.6±0.6	-28.6±0.6	-28.6±0.6	-28.6±0.6	-28.6±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
Isolation Min. Adjacent Circuits	-70	-70	-70	-70	-70	-70	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #8: 4 Way Combiner, MBB with 0 dB Default Port Attenuation

ASSEMBLY TYPE MBB 2-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss C-Port to Ports 1-2	-4.6±0.5	-4.6±0.5	-4.6±0.5	-4.6±0.5	-4.6±0.5	-4.6±0.7	dB
Monitor Level C-Port to M-Port	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
Isolation Min. Adjacent Circuits	-70	-70	-70	-70	-70	-70	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #9: 2 Way Splitter, MBB with 0 dB Default Port Attenuation

ASSEMBLY TYPE MBB 2-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1-2 to C-Port	-4.6±0.5	-4.6±0.5	-4.6±0.5	-4.6±0.5	-4.6±0.5	-4.6±0.7	dB
Monitor Level Ports 1-2 to M-Port	-24.6±0.6	-24.6±0.6	-24.6±0.6	-24.6±0.6	-24.6±0.6	-24.6±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
Isolation Min. Adjacent Circuits	-70	-70	-70	-70	-70	-70	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #10: 2 Way Combiner, MBB with 0 dB Default Port Attenuation

ASSEMBLY TYPE DIRECTIONAL COUPLER	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss IN Port to OUT Port	-1.2±0.5	-1.2±0.5	-1.2±0.5	-1.2±0.5	-1.2±0.5	-1.2±0.5	dB
Insertion Loss IN Port to DC Port	-12.3±0.5	-12.3±0.5	-12.3±0.5	-12.3±0.5	-12.3±0.5	-12.3±0.5	dB
Return Loss Min. All Ports	-19	-19	-19	-19	-19	-19	dB
Reverse Isolation	-30	-30	-30	-30	-30	-30	dB
Ingress Isolation	-100	-100	-100	-100	-100	-100	dB

Table #11: 12 dB Directional Coupler



ASSEMBLY TYPE DIRECTIONAL COUPLER		SPECIFICATIONS						UNITS
		5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss IN Port to OUT Port		–7.2±0.9	–7.2±0.9	–7.7±0.7	–7.7±0.7	–7.7±0.7	–7.76±0.9	dB
Return Loss Min. IN and Out Port		–12.5	–15	–15	–15	–15	–15	dB
Reverse Isolation Min. DC Ports to IN Port		–28	–28	–28	–28	–28	–28	dB
Return Loss Min. Ports 1 – 6		–17	–17	–17	–17	–15	–15	dB
Isolation Min. DC Port to DC Port		–38	–38	–38	–38	–38	–38	dB
EMI Min. Near Field		–100	–100	–100	–100	–100	–100	dB
PORT INSERTION LOSS WITH NO PADS INSTALLED								
Insertion Loss Port 1 to OUT		–13.1±0.9	–13.1±0.9	–13.4±0.7	–13.4±0.7	–13.4±0.7	–13.4±0.9	dB
Insertion Loss Port 2 to OUT		–14.1±0.9	–14.1±0.9	–14.4±0.7	–14.4±0.7	–14.4±0.7	–14.4±0.9	dB
Insertion Loss Port 3 to OUT		–15.1±0.9	–15.1±0.9	–15.4±0.7	–15.4±0.7	–15.4±0.7	–15.4±0.9	dB
Insertion Loss Port 4 to OUT		–16.1±0.9	–16.1±0.9	–16.4±0.7	–16.4±0.7	–16.4±0.7	–16.4±0.9	dB
Insertion Loss Port 5 to OUT		–17.1±0.9	–17.1±0.9	–17.4±0.7	–17.4±0.7	–17.4±0.7	–17.4±0.9	dB
Insertion Loss Port 6 to OUT		–18.1±0.9	–18.1±0.9	–18.4±0.7	–18.4±0.7	–18.4±0.7	–18.4±0.9	dB
ASSEMBLY TYPE DIRECTIONAL COUPLER	SPECIFICATIONS							
	PAD VALUE	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	UNITS
PORT INSERTION LOSS 1–5 dB PADS INSTALLED								
Insertion Loss Port 1 to OUT	5 dB	–18.1±0.9	–18.1±0.9	–18.4±0.7	–18.4±0.7	–18.4±0.7	–18.4±0.9	dB
Insertion Loss Port 2 to OUT	4 dB	–18.1±0.9	–18.1±0.9	–18.4±0.7	–18.4±0.7	–18.4±0.7	–18.4±0.9	dB
Insertion Loss Port 3 to OUT	3 dB	–18.1±0.9	–18.1±0.9	–18.4±0.7	–18.4±0.7	–18.4±0.7	–18.4±0.9	dB
Insertion Loss Port 4 to OUT	2 dB	–18.1±0.9	–18.1±0.9	–18.4±0.7	–18.4±0.7	–18.4±0.7	–18.4±0.9	dB
Insertion Loss Port 5 to OUT	1 dB	–18.1±0.9	–18.1±0.9	–18.4±0.7	–18.4±0.7	–18.4±0.7	–18.4±0.9	dB
Insertion Loss Port 6 to OUT	No Pad	–18.1±0.9	–18.1±0.9	–18.4±0.7	–18.4±0.7	–18.4±0.7	–18.4±0.9	dB

Table #12: 6-Circuit 12 dB Directional Coupler with Narrowcast Combiner

ASSEMBLY TYPE DIRECTIONAL COUPLER	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss IN Port to OUT Port	–0.6±0.5	–0.6±0.5	–0.6±0.5	–0.6±0.5	–0.6±0.5	–0.6±0.5	dB
Insertion Loss IN Port to DC Port	–20±0.5	–20±0.5	–20±0.5	–20±0.5	–20±0.5	–20±0.5	dB
Return Loss Min. All Ports	–19	–19	–19	–19	–19	–19	dB
Reverse Isolation	–30	–30	–30	–30	–30	–30	dB
Ingress Isolation	–100	–100	–100	–100	–100	–100	dB

Table #13: 20 dB Directional Coupler

ASSEMBLY TYPE DIRECTIONAL COUPLER	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss IN Port to OUT Port	–1.4±0.5	–1.4±0.5	–1.4±0.5	–1.4±0.5	–1.4±0.5	–1.4±0.8	dB
Insertion Loss IN Port to DC Port	–9±0.5	–9±0.5	–9±0.5	–9±0.5	–9±0.5	–9±0.7	dB
Return Loss Min. All Ports	–18	–18	–18	–18	–18	–16	dB
Isolation Min. OUT Port to DC Port	–30	–30	–30	–30	–30	–28	dB
Isolation Min. Circuit to Circuit	–70	–70	–70	–70	–70	–65	dB
EMI Min. Near Field	–100	–100	–100	–100	–100	–100	dB

Table #14: 9 dB Directional Coupler

ASSEMBLY TYPE 2-WAY, BNC	SPECIFICATIONS					UNITS
	5–42 MHz	54–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Max. Low Port	–1.4	N/A	N/A	N/A	N/A	dB
Insertion Loss Max. High Port	N/A	–1.4	–1.4	–1.4	–1.4	dB
Return Loss Min. Low Port	–17.0	N/A	N/A	N/A	N/A	dB
Return Loss Min. High Port	N/A	–15	–15	–15	–15	dB
Return Loss Min. Common Port	–17.0	–15.0	–15.0	–15.0	–15.0	dB
Isolation Min. Low to High Ports	–50.0	–45.0	–45.0	–45.0	–40.0	dB
Isolation Min. Adjacent Circuits	–70	–70	–70	–70	–65	dB
EMI Min. Near Field with Gasket	–100	–100	–100	–100	–100	dB

Table #15: N-MDPXB3L, N-MDPXF-3L (3X) Diplexer 5–42 MHz/54–1000 MHz

ASSEMBLY TYPE 2-WAY, BNC	SPECIFICATIONS					UNITS
	5–65 MHz	88–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Max. Low Port	–1.4	N/A	N/A	N/A	N/A	dB
Insertion Loss Max. High Port	N/A	–1.4	–1.4	–1.4	–1.4	dB
Return Loss Min. Low Port	–17.0	N/A	N/A	N/A	N/A	dB
Return Loss Min. High Port	N/A	–15	–15	–15	–15	dB
Return Loss Min. Common Port	–17.0	–15.0	–15.0	–15.0	–15.0	dB
Isolation Min. Low to High Ports	–50.0	–45.0	–45.0	–45.0	–40.0	dB
Isolation Min. Adjacent Circuits	–70	–70	–70	–70	–65	dB
EMI Min. Near Field with Gasket	–100	–100	–100	–100	–100	dB

Table #16: N-MDPXB3H, N-MDPXF3H (3X) Diplexer 5–65 MHz/88–1000 MHz

	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Input to Output	–1.5±0.4	–1.5±0.4	–1.5±0.4	–1.5±0.4	–1.5±0.4	–1.5±0.5	dB
Monitor Level Input to Monitor	–21.5±0.5	–21.5±0.5	–21.5±0.5	–21.5±0.5	–21.5±0.5	–21.5±0.6	dB
Return Loss Min. All Ports	–19	–19	–19	–19	–19	–19	dB
EMI Min. Near Field	–100	–100	–100	–100	–100	–100	dB

Table #17: N-MMF320FM0, N-MMB320FM0 Signal-Conditioning Module

	SPECIFICATIONS				
	Freq (MHZ)	Min	Typ	Max	UNITS
Insertion Loss, NC In	5-1002	-10	-12	-13	dB
Insertion Loss, BC In		-3	-5	-6	
Isolation, NC-NC Input		-28	-30		
Isolation, NC-BC Input		-32	-35		
Isolation, Device to Device		-75			
Test Point (Relative to Common)		-11	-12	-13	
Return Loss (Test Point)		-18			
Return Loss, In/Out	5-15	-19			dB
	15-1002	-20			
Isolation Min. Adjacent Circuits	5-860			-70	
	860-1002			-65	

Table #18: N-MCF24BCNC &amp; N-MCB24BCNC Dual 4-port Broadcast/Narrowcast Combiner

## Obsolete Modules

ASSEMBLY TYPE MBB 8-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss C-Port to Ports 1-8	-18.4±0.5	-18.4±0.5	-18.4±0.5	-18.4±0.5	-18.4±0.5	-18.4±0.7	dB
Monitor Level C-Port to M-Port	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #19: 8 Way Splitter, MBB with 6 dB Default Port Attenuation

ASSEMBLY TYPE MBB 8-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1-8 to C-Port	-18.4±0.5	-18.4±0.5	-18.4±0.5	-18.4±0.5	-18.4±0.5	-18.4±0.7	dB
Monitor Level Ports 1-8 to M-Port	-38.4±0.6	-38.4±0.6	-38.4±0.6	-38.4±0.6	-38.4±0.6	-38.4±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #20: 8 Way Combiner, MBB with 6 dB Default Port Attenuation

ASSEMBLY TYPE MBB 4-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss C-Port to Ports 1-4	-14.6±0.5	-14.6±0.5	-14.6±0.5	-14.6±0.5	-14.6±0.5	-14.6±0.7	dB
Monitor Level C-Port to M-Port	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
Isolation Min. Adjacent Circuits	-70	-70	-70	-70	-70	-70	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #21: 4 Way Splitter, MBB with 6 dB Default Port Attenuation

ASSEMBLY TYPE MBB 4-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1-4 to C-Port	-14.6±0.5	-14.6±0.5	-14.6±0.5	-14.6±0.5	-14.6±0.5	-14.6±0.7	dB
Monitor Level Ports 1-4 to M-Port	-34.6±0.6	-34.6±0.6	-34.6±0.6	-34.6±0.6	-34.6±0.6	-34.6±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
Isolation Min. Adjacent Circuits	-70	-70	-70	-70	-70	-70	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #22: 4 Way Combiner, MBB with 6 dB Default Port Attenuation

ASSEMBLY TYPE MBB 2-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss C-Port to Ports 1-2	-10.6±0.5	-10.6±0.5	-10.6±0.5	-10.6±0.5	-10.6±0.5	-10.6±0.7	dB
Monitor Level C-Port to M-Port	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.6	-20.0±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
Isolation Min. Adjacent Circuits	-70	-70	-70	-70	-70	-70	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #23: 2 Way Splitter, MBB with 6 dB Default Port Attenuation

ASSEMBLY TYPE MBB 2-WAY, NO PADS	SPECIFICATIONS						UNITS
	5–10 MHz	10–50 MHz	50–550 MHz	550–750 MHz	750–860 MHz	860–1000 MHz	
Insertion Loss Ports 1-2 to C-Port	-10.6±0.5	-10.6±0.5	-10.6±0.5	-10.6±0.5	-10.6±0.5	-10.6±0.7	dB
Monitor Level Ports 1-2 to M-Port	-30.6±0.6	-30.6±0.6	-30.6±0.6	-30.6±0.6	-30.6±0.6	-30.6±0.8	dB
Return Loss Min. All Ports	-20	-20	-20	-20	-20	-20	dB
Isolation Min. Adjacent Ports	-30	-30	-30	-30	-30	-30	dB
Isolation Min. Adjacent Circuits	-70	-70	-70	-70	-70	-70	dB
EMI Min. Near Field	-100	-100	-100	-100	-100	-100	dB

Table #24: 2 Way Combiner, MBB with 6 dB Default Port Attenuation

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## SERVICE & SUPPORT

### 9. Service & Support

#### 9.1. Contact ATX Networks

Please contact ATX Technical Support for assistance with any ATX products. Please contact ATX Customer Service to obtain a valid RMA number for any ATX products that require service and are in or out-of-warranty before returning a failed module to the factory.

##### TECHNICAL SUPPORT

Tel: (905) 428-6068

Toll Free: (800) 565-7488 (USA & Canada only)

► Press \*3 for **Technical Support**

► Then press 1 for **Digital Video Products (DVIS, DigiVu, UCrypt, etc.)**

► OR, press 2 for **All Other Products**

Email: [digitalvideosupport@atxnetworks.com](mailto:digitalvideosupport@atxnetworks.com) for **Digital Video Products**

Email: [jleskovar@atxnetworks.com](mailto:jleskovar@atxnetworks.com) for **All Other Products**

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Web: [www.atxnetworks.com](http://www.atxnetworks.com)

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#### 9.2. Warranty Information

All of ATX Networks' products have a 1-year warranty that covers manufacturer's defects or failures.

#### 9.3. Safety

**IMPORTANT! FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:**

**WATER AND MOISTURE:** Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

**POWER SOURCES:** The device should be connected to a power supply only of the type described in the operating instructions or as marked on the device.

**GROUNDING OR POLARIZATION:** Precautions should be taken so that the grounding or polarization means of the device is not defeated.

**POWER CORD PROTECTION:** Power supply cords should be routed so that they are not likely to be pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the device.

**SERVICING:** The user should not attempt to service the device beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

**FUSING:** If your device is equipped with a fused receptacle, replace only with the same type fuse. Refer to replacement text on the unit for correct fuse type.



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